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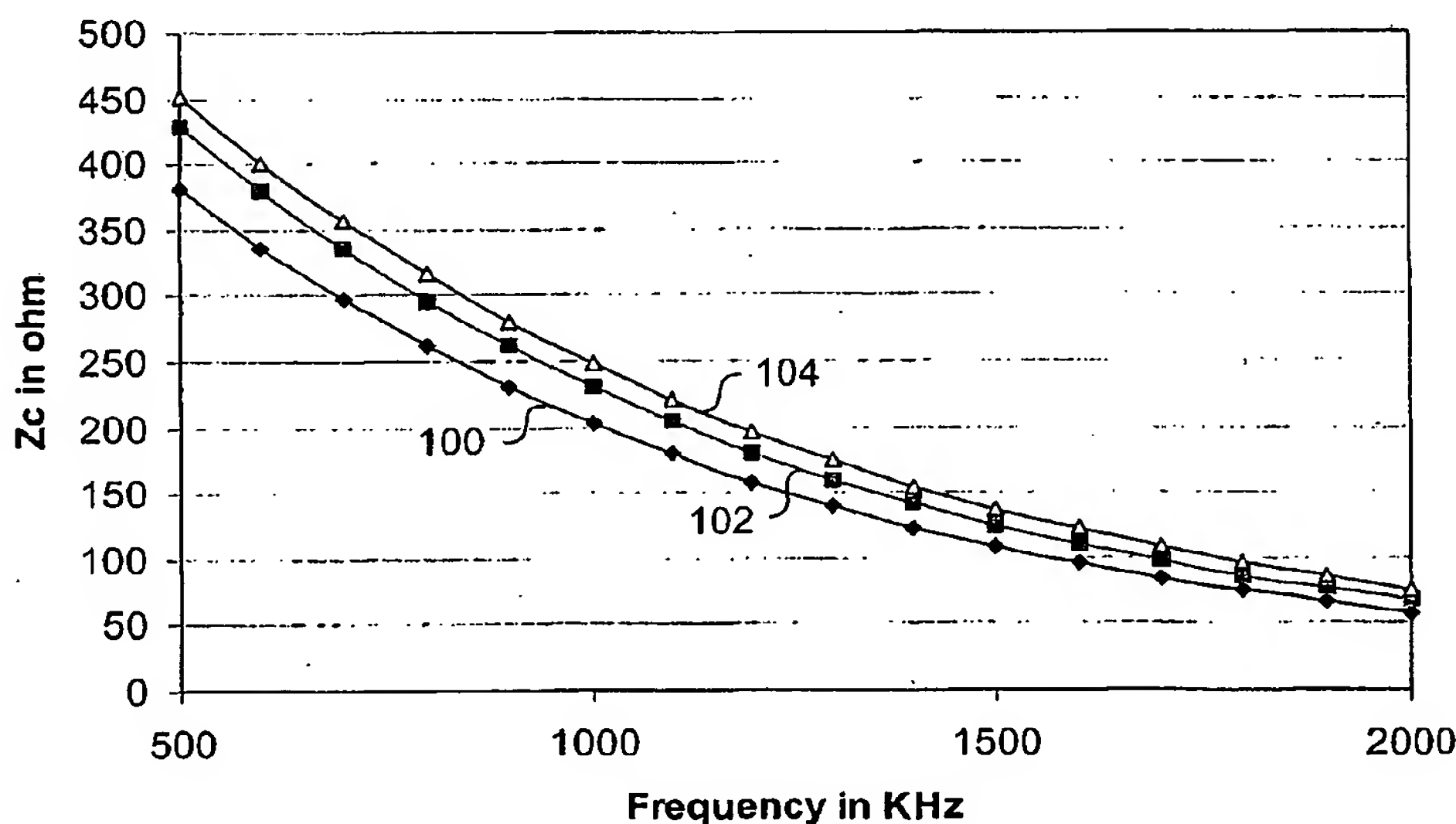
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(54) Title: **ELECTRIC WINDING DISPLACEMENT DETECTION METHOD AND APPARATUS**



(57) Abstract: A method and system for obtaining the characteristic impedance of an electrical winding by measuring the input and output voltages and the currents within a winding across a low frequency range, and applying transmission line properties to model the winding. The characteristic impedance ( $Z_c$ ) is directly proportional to the capacitance of the winding, and is independent of external circuits. Thus any changes to  $Z_c$  will reflect movements of the winding that would affect the capacitance. Because  $Z_c$  has a smooth and robust monotonical relationship with frequency of the applied signal, the resulting curve is exponential in shape. A relative comparison between  $Z_c$  curves will provide a clear indication of the overall axial or radial winding movements, or winding faults, which can be used to assess the overall health of the winding.



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- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA,

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